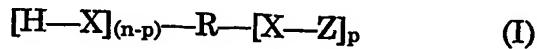


WHAT IS CLAIMED IS:

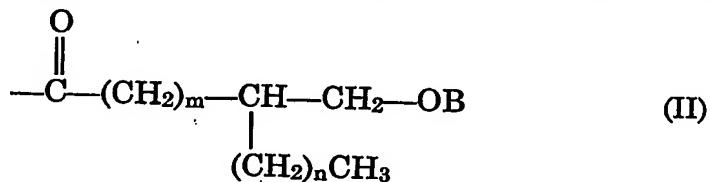
1. A method of preparing a polyurethane foam comprising bringing an organic polyisocyanate into contact with a polyol composition containing a high equivalent weight polyol or mixture of high equivalent weight polyols, in the presence of a blowing agent and a surfactant, under conditions such that the polyisocyanate reacts with the polyol composition and the blowing agent produces a gas, to form a cellular polyurethane and/or polyurea polymer, wherein at least 10% by weight of the high equivalent weight polyol(s) is one or more hydroxymethyl-containing polyester polyols prepared by reacting a hydroxymethyl group-containing fatty acid having from 12-26 carbon atoms, or an ester of such a hydroxymethyl group containing fatty acid, with a polyol or polyamine initiator compound having an average of at least 2 hydroxyl, primary amine and/or secondary amine groups, such that the hydroxymethyl-containing polyester polyol contains an average of at least 1.3 repeating units derived from the hydroxymethyl-group-containing fatty acid or ester per total number of hydroxyl, primary amine and secondary amine groups in the initiator compound, and the hydroxymethyl-containing polyester polyol has an equivalent weight of at least 400 up to 15,000.
2. The method of claim 1, wherein the equivalent weight of the hydroxymethyl-containing polyester polyol is from about 700 to about 3500.
3. The method of claim 2, wherein the hydroxymethyl-containing polyester polyol contains an average of about 2.5 to about 5 hydroxyl, primary amine or secondary amine groups per molecule.
4. The method of claim 3, which is a free-rise process to produce slabstock polyurethane foam.
5. The method of claim 4, wherein the hydroxymethyl-containing polyester polyol constitutes about 35-100% by weight of the high equivalent weight polyol(s).
6. The method of claim 5, wherein the polyurethane foam has a density of about 1.2 to about 2.0 pounds per cubic foot.

7. The method of claim 6, wherein the blowing agent is water.

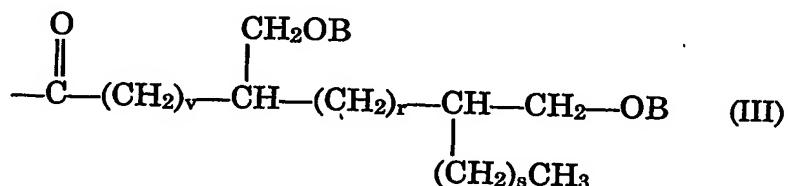
8. The method of claim 7, wherein the hydroxymethyl-containing polyester polyol has the following average structure:



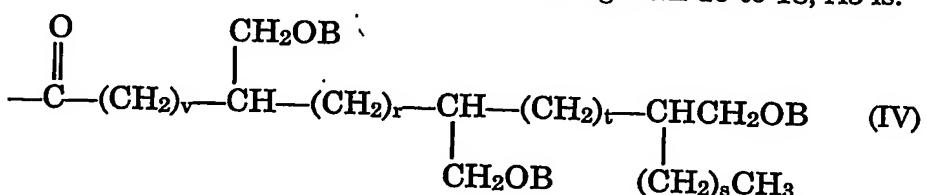
wherein R is the residue of an initiator compound having n hydroxyl and/or primary or secondary amine groups, where n is at least two; each X is independently $-O-$, $-NH-$ or $-NR'$ in which R' is an inertly substituted alkyl, aryl, cycloalkyl, or aralkyl group, p is a number from 1 to n representing the average number of [X-Z] groups per hydroxymethyl-containing polyester polyol molecule, Z is a linear or branched chain containing one or more A groups, provided that the average number of A groups per molecule is ≥ 1.3 times n, and each A is independently selected from the group consisting of A1, A2, A3, A4 and A5, provided that at least some A groups are A1, A2 or A3, wherein A1 is:



wherein B is H or a covalent bond to a carbonyl carbon atom of another A group; m is number greater than 3, n is greater than or equal to zero and m + n is from 11 to 19; A2 is:



wherein B is as before, v is a number greater than 3, r and s are each numbers greater than or equal to zero with v + r + s being from 10 to 18, A3 is:



wherein B, v, each r and s are as defined before, t is a number greater than or equal to zero, and the sum of v, r, s and t is from 10 to 18; A4 is



where w is from 10-24, and A5 is



where R' is a linear or branched alkyl group that is substituted with at least one cyclic ether group and optionally one or more hydroxyl groups or other ether groups.

9. The method of claim 8, wherein the hydroxymethyl-containing polyester polyol constitutes about 80-100% by weight of the high equivalent weight polyol(s).

10. The method of claim 9, wherein the surfactant is represented by the formula $\text{MD}_x\text{D}'_y\text{M}$, wherein

each M is independently $(\text{CH}_3)_3\text{SiO}_{1/2}$ or $\text{R}(\text{CH}_3)_2\text{SiO}_{1/2}$;

D is $(\text{CH}_3)_2\text{SiO}_{1/2}$;

D' is $\text{R}(\text{CH}_3)\text{SiO}_{2/2}$;

x is 40-220, y is 5-40, $x/y < 10$; and

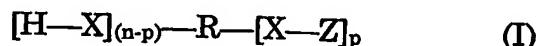
each R is independently a high atomic mass polyether group or a low atomic mass polyether group, provided that a sufficient number of R groups are high atomic mass polyether groups that the average atomic mass of all polyether groups is at least 1000, especially at least 1100.

11. The method of claim 3, which is a free-rise process to produce high resiliency slabstock polyurethane foam.

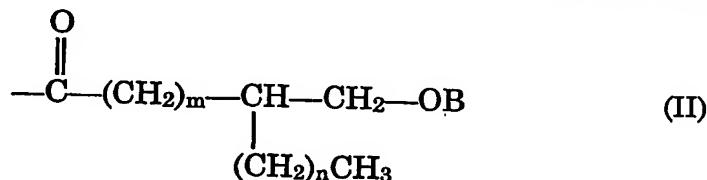
12. The method of claim 11, wherein the hydroxymethyl-containing polyester polyol constitutes about 35-100% by weight of the high equivalent weight polyol(s).

13. The method of claim 12, wherein the blowing agent is water.

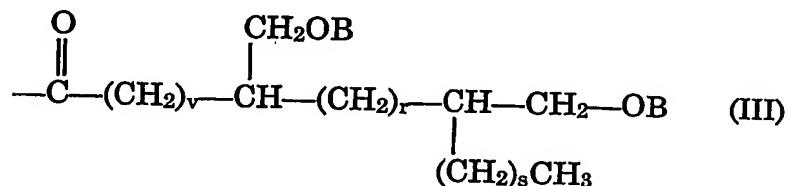
14. The method of claim 13, wherein the hydroxymethyl-containing polyester polyol has the following average structure:



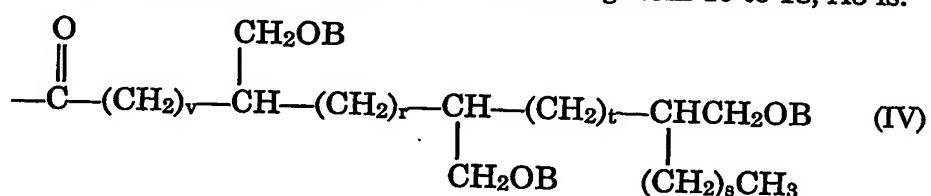
wherein R is the residue of an initiator compound having n hydroxyl and/or primary or secondary amine groups, where n is at least two; each X is independently —O—, —NH— or —NR'— in which R' is an inertly substituted alkyl, aryl, cycloalkyl, or aralkyl group, p is a number from 1 to n representing the average number of [X—Z] groups per hydroxymethyl-containing polyester polyol molecule, Z is a linear or branched chain containing one or more A groups, provided that the average number of A groups per molecule is ≥ 1.3 times n, and each A is independently selected from the group consisting of A1, A2, A3, A4 and A5, provided that at least some A groups are A1, A2 or A3, wherein A1 is:



wherein B is H or a covalent bond to a carbonyl carbon atom of another A group; m is number greater than 3, n is greater than or equal to zero and m + n is from 11 to 19; A2 is:



wherein B is as before, v is a number greater than 3, r and s are each numbers greater than or equal to zero with v + r + s being from 10 to 18, A3 is:



wherein B, v, each r and s are as defined before, t is a number greater than or equal to zero, and the sum of v, r, s and t is from 10 to 18; A4 is



where w is from 10-24, and A5 is



where R' is a linear or branched alkyl group that is substituted with at least one cyclic ether group and optionally one or more hydroxyl groups or other ether groups.

15. The method of claim 14, wherein the foam has a density of about 2.0 to about 5 pounds per cubic foot.

16. The method of claim 15, wherein the equivalent weight of the hydroxymethyl-containing polyester polyol is from about 700 to about 1000.

17. The method of claim 16, wherein the surfactant contains up to about 20 siloxane units per molecule and contain about one pendant polyether group per every 3-8 siloxane units, wherein the pendant polyether groups are preferably polymers of ethylene oxide, propylene oxide or a mixture of ethylene oxide and propylene oxide that have an average atomic mass of about 200-1000 daltons.

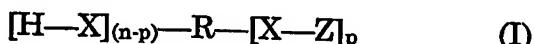
18. The method of claim 17, which is conducted in the absence of an organotin catalyst.

19. The method of claim 16, wherein the hydroxymethyl-containing polyester polyol constitutes about 35-65% of the total weight of the high equivalent weight polyol(s).

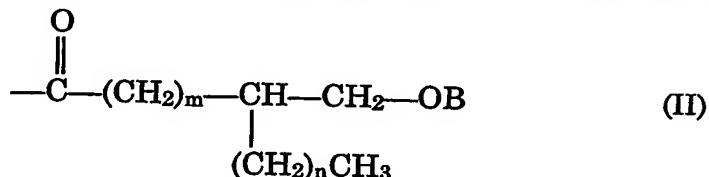
20. The method of claim 3 wherein the polyol composition and the polyisocyanate composition react within a closed mold.

21. The method of claim 20, wherein the hydroxymethyl-containing polyester polyol constitutes about 10-50% of the total weight of the high equivalent weight polyol(s).

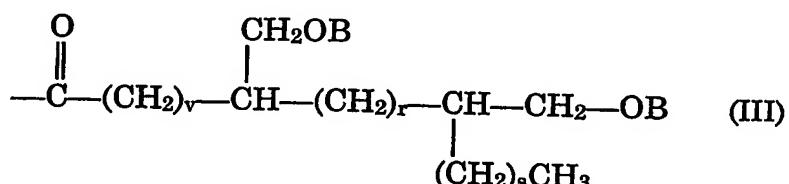
22. The method of claim 21, wherein the hydroxymethyl-containing polyester polyol has the following average structure:



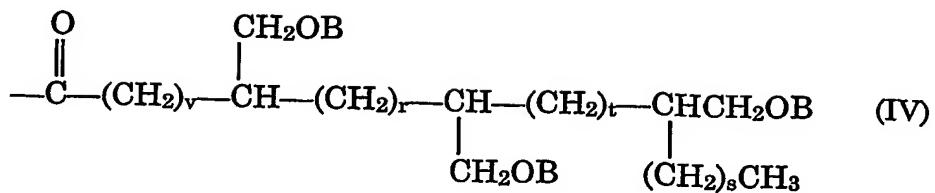
wherein R is the residue of an initiator compound having n hydroxyl and/or primary or secondary amine groups, where n is at least two; each X is independently —O—, —NH— or —NR'— in which R' is an inertly substituted alkyl, aryl, cycloalkyl, or aralkyl group, p is a number from 1 to n representing the average number of [X—Z] groups per hydroxymethyl-containing polyester polyol molecule, Z is a linear or branched chain containing one or more A groups, provided that the average number of A groups per molecule is ≥ 1.3 times n, and each A is independently selected from the group consisting of A1, A2, A3, A4 and A5, provided that at least some A groups are A1, A2 or A3, wherein A1 is:



wherein B is H or a covalent bond to a carbonyl carbon atom of another A group; m is number greater than 3, n is greater than or equal to zero and m + n is from 11 to 19; A2 is:



wherein B is as before, v is a number greater than 3, r and s are each numbers greater than or equal to zero with v + r + s being from 10 to 18, A3 is:



wherein B, v, each r and s are as defined before, t is a number greater than or equal to zero, and the sum of v, r, s and t is from 10 to 18; A4 is



where w is from 10-24, and A_5 is



where R' is a linear or branched alkyl group that is substituted with at least one cyclic ether group and optionally one or more hydroxyl groups or other ether groups.

23. The process of claim 22 wherein the blowing agent is water.
24. The process of claim 23 which is a hot-molding process.
25. The process of claim 23 which is a cold-molding process.
26. A polyurethane foam made in the method of claim 1.
27. A polyurethane foam made in the method of claim 4.
28. A polyurethane foam made in the method of claim 8.
29. A polyurethane foam made in the method of claim 9.
30. A polyurethane foam made in the method of claim 10.

31. A polyurethane foam made in the method of claim 11.
32. A polyurethane foam made in the method of claim 14.
33. A polyurethane foam made in the method of claim 17.
34. A polyurethane foam made in the method of claim 20.
35. A polyurethane foam made in the method of claim 22.